RTTY

FSK Modification for KWS-1

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NEWS OF AMATEUR RTTY

OCTOBER, 1957
25 Cents
Vol. 5, No. 10

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air.

WANTED: Model 14 TD....W6PGP
WANTED: Aug. '55, Jan., Apr., Aug '56, RTTY....K4KKZ
WANTED: Information on FC#C1-ZA/CAN 9367 FEF....K4KKZ
FOR SALE: Model 12, trade on Tape gear....W9HKA
FOR SALE: Model 15 complete with table....Robert C. Clark, Box 1244, 5050 Comm Maint Sq. APO 942 Seattle.
WANTED: August 1953 and October 1954 RTTY....W8LEX
FOR SALE: 26 type pallett conversion kits ($8.00)....W9GRW
FOR SALE: ARC-4 Two meter with rack and dynamotor, very clean....K6GJM

FOR SALE: Complete Station. 522 tran. & Rec., T. U. with 7" scope mounted in Bud relay rack cabinet. W6CMQ

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Arcadia, California
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Modification of Collins KWS-1 for Frequency Shift Keying

BY FRANK C. WHITE, W3PYW

The Collins people tell you you can get frequency shift keying out of the KWS-1 by putting in two-tone audio, and they are right. I tried it about a year and a half ago and was fairly well pleased with the results. Only trouble is, you gotta be careful about what you are doing if you do not want a billet doux from the Fox Charlie Charlie.

Some folks call me ingenious, my wife says I am lazy. I think she is right, cause I am always looking for an easier (often better) way of doing things. You would not think there would be an easier way of creating fsk with a KWS-1 than just putting in the two-tone audio, but let me assure you there is (almost that is).

Most of the fellows have the 2125 cps and 2975 cps audio tones to use for creating the fsk with the KWS-1. The audio of the KWS-1 is made so it passes 3000 cps and droops real fast thereafter. Some KWS-1 units droop before the 3000 cps is reached — and 2975 is near 3000 cps. Here is the way you find out if yours does. Put the 2125 tone into the KWS-1 and observe the final amplifier plate current. Then shift the audio to 2975 and observe the plate current. If the plate current drops off, you have "droop trouble." Two KWS-1 of three, (that I have observed in this manner) had less output at 2975 than at 2125; this puts "bias" in your teletype signal, and you are started for trouble.

What if the two-tone audio you put in does not have the same amplitude on mark as it does on space — more bias

What if the audio is not pure sine wave? More trouble. You have spurious signals, and the FCC writes you a QSL card.

Not for any friend that asks me for advice, shifting the oscillator is the "easy" way. Let us see how to go about doing it.

If you have a 26, or 15, or other type of single magnet printer, put a polar relay in series with the printer magnet. The polar relay will then be available to key a stablized DC source to use for creating FSK. When I said stabilized, I meant stabilized. Use a VR tube and stabilize to 150 volts DC. The frequency shifter is a 6AL5. Yes, I said 6AL5. Do not use a 1N34 germanium unless you want more trouble. Build up the diode shifter in a small metal box, Mini Box has a "standard" item that fits o.k. Put the potentiometer on the box in such a way it is accessible when the box is bolted in place in the KWS-1. The metal box is bolted against the side of the RF shield cover of the KWS-1 by loosening one of the existing screws and slipping the lip of the box under it (see drawing). Obtain the filament voltage from the dial light circuit (two 6" leads).

The output of the diode shifter is a 20mmf mica condenser. Tie a small wire to this and run it over to the grid pin of the oscillator (V001). Pull the oscillator tubes, wrap the small wire around the grid pin (No. 1), and plug it back in the socket.

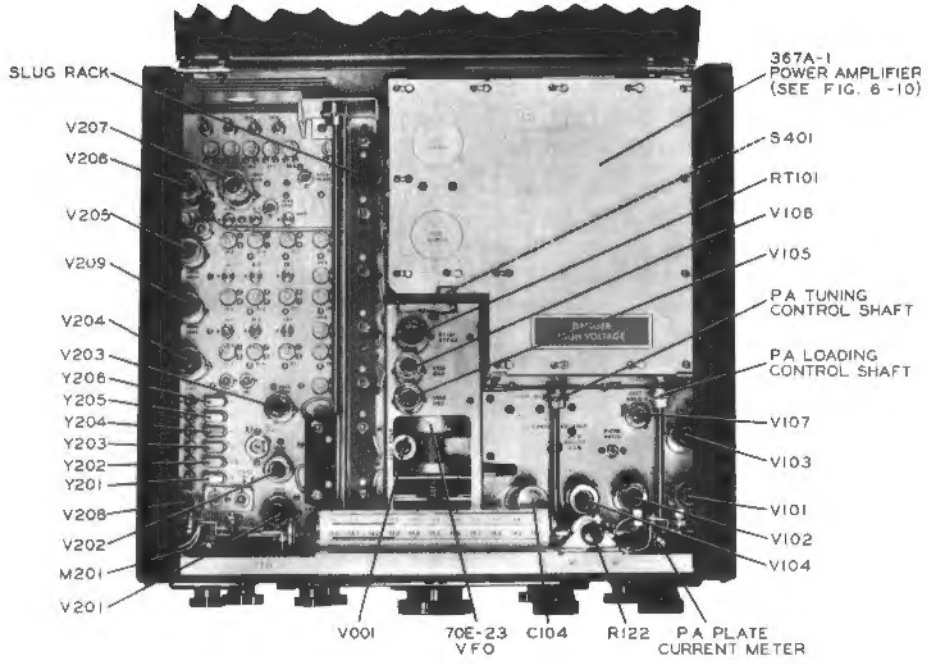
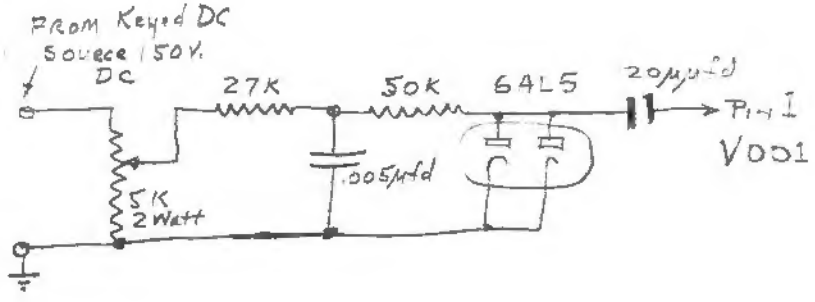


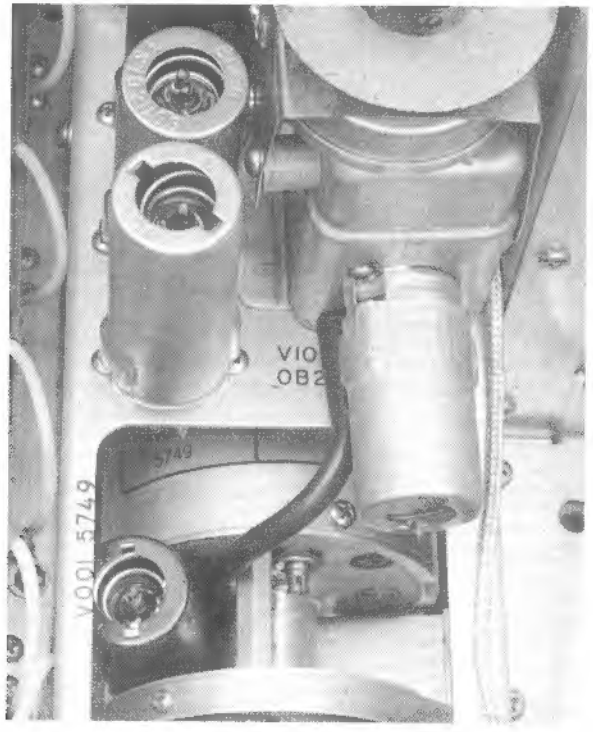
Figure 6-2. Exciter/Power Amplifier, Top View, Top Cover Open



You will find that stray capacity (added in this way) moves the oscillator frequency about 15kc. This error cannot be corrected by using the rotable index. Loosen the allen screws on the shaft of the VFO (where it connects to the dial drive) and correct for this change, so that the movable index is at the middle of the window. If the entire modification takes you more than half an hour, you are a slow poke.

Setting the shift is a breeze. Just adjust the potentiometer with a space signal in your converter (voltage on the potentiometer). The adjustment is smooth as silk and can be set to anything from zero to about 900 cps. Another feature of accomplishing the PSK in this manner is that the shift is correct for 40-20 or 80 meters once it is set for one band.

You will note that the entire modification is one that can be removed easily if (and when) you decide to peddle your KWS-1 — but who is selling them? Wish I had one too.



The 6AL5 is mounted on the side of a 1¼" x 1¼" shield can. The potentiometer (and dial) are mounted atop the can. The capacity, coupling the 6AL5 diodes to the VFO (V001) grid is formed by the RG58U or RG59U coax, which may be seen running out of the bottom of the can to the VFO grid.

DESCRIPTION FSK OSCILLATOR, Courtesy VK-3-KF

BY FORREST CASTLE, (KR6AK) OKINAWA

The 12AU7 tube circuit is somewhat similar to a locked multi-vibrator. The feedback being adjusted by the coupling C and anode loads around the tube to the point where the crystal takes charge. The values shown are suitable fof crystals between 2 and 4 Mes.

In series with the crystal is an LC network, which for the purpose of operation with our form of FS is essentially inductive in character if the point "X" in circuit diagram is shorted to ground the crystal oscillates at its natural freq. and when the short is removed the crystal oscillates either higher or lower in frequency depending on the character of the series reactance. We use essentially XL cut.

The variable capacitor shunted across L is used to adjust the amount of frequency shift to the desired value, depending on the number of frequency multiplier stages following the oscillator. With a crystal having good activity, a shift at the fundamental frequency of well over 1 KC can be achieved.

The .02 mfd mica condenser between the crystal and the LC network should be of good quality in the interest of stability and of low reactance at the operating frequency.

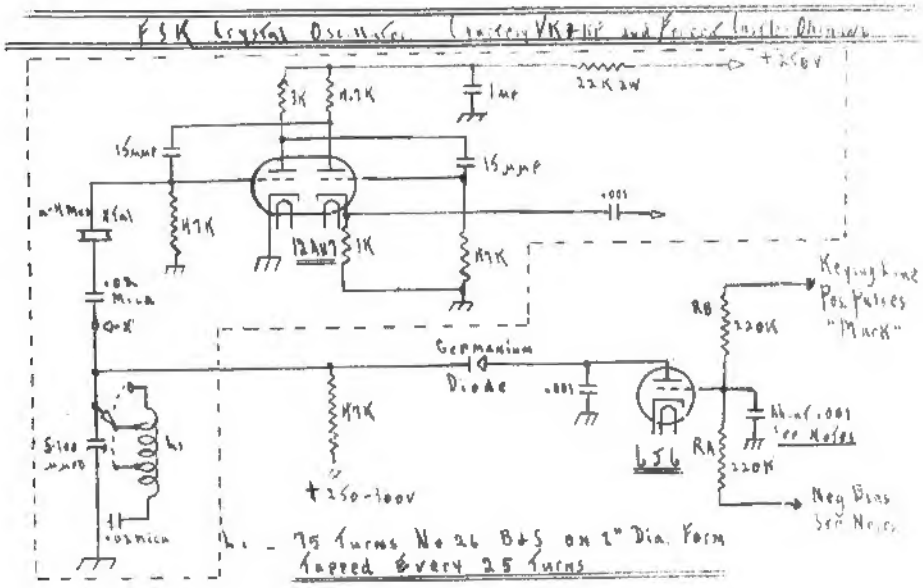
The crystal diode and 6J6 tube shunted across the LC network provide the Mark and Space keying facilities in practice, negative bias is applied to the grid of the tube through RA of sufficient amplitude to bias the tube to cut off when the keying line is open. With the tube at cut off, the crystal diode is not conducting and the shunting effect across the LE net work is at a minimum. This allows the reactance of the network to be effectively in series with the crystal, so shifting its frequency from its normal oscillating frequency to one determined by the effective reactance of the network. Now, application of a positive voltage to the grid of the 6J6 tube bucks the standing negative voltage and causes the tube and consequently the diode to conduct, so placing a partial short circuit across the LC network provided by the .001 capacitor in parallel with the 6J6 tube. This in effect brings the bottom of the crystal almost to ground potential and consequently it oscillates at almost the same frequency as it would when point "X" is metallically brought to ground. The difference in frequency between metallic and electronic ground varies with crystals but it has been found that it is about 100 CPS at about 3.5 Mes.

The positive voltage applied by keying should be of such magnitude as to cause the 6J6 to draw not less than 4MA and 5MA is quite effective. The value of the capacitor between the grid of the 6J6 and ground should be as small as possible consistent with the reduction of key thumps in adjacent channels. The clicks can be bad with crystals having marginal activity. Without any C the keyed waveform is as follows: No. 1 without C, No. 2 with C added.

FIG 1 FIG 2

With about .001 mfd being used this introduces about 3 percent start and end distortion which is not objectionable.

Adjust the negative bias to a value just beyond cut off for the 6J6, close the keying line, adjust positive voltage keying to the point where the 6J6 draws 6MA. It may be necessary to raise the HT supply to about 300 volt to do this. The 47K resistor should not be reduced below that value — monitoring the carrier output, close the keying line and measure the beat frequency produced by this character. Place the tap on L to position 2 open the keying line and from minimum capacity gradually increase the C while listening or otherwise monitoring the output frequency. C should be increased until the difference is 850 CPS between line open and line closed. If this cannot be done before the condenser is tuned to not more than half capacity, place the coil tap on 1 and start tuning from minimum C. This FS oscillator has been in use by our company for two years and it is shown that we have less than 20 CPS frequency variation. The dotted lines on schematic indicate temperature controlled oven which we use.



Midwest Amateur Radio Teletypers Society, Inc.

BY D. L. (MAC) McMULLEN, WØATM

The Midwest ARRL Convention was held in the Town House Hotel, Kansas City, Kansas, September 21, 1957. The Convention ended at noon Sunday September 22, 1957. From all we have heard, the Convention was a "big" success.

M.A.R.T.S., Inc. was asked by the program chairman to supply a display of Teletypewriter equipment. We did not have too much time, and since the program had already been published, no space was available for us to make any talks on the subject. Due to the shortage of time; it was felt that we should concentrate on the various types of printers, rather than the various types of TU's. We later found that this was a wise choice because our display room was by far too small for the amount of visitors that viewed the equipment. The Society here could not supply all of the printers that we felt should be displayed and I would like at this time to thank the Southwestern Bell Telephone Co. for their splendid cooperation in supplying the printers we asked for. Even though there was a Labor dispute at this time, every effort was made by them to see that we still received the equipment on time.

Part of the equipment for display had to be returned before it was set up, due to the lack of available space for us. We ended up by leaving the equipment in photo #1. Reading right to left: A Model 27, 26, 14, 19, 28 and 15. We also had a Collins 51J, (from the "Shack" of WØLD) to copy press stations. A Gonset Comm. was set up to have AFSK contacts with Two Meter stations in the area. WØIQC furnished the TU for display. Photo #2 shows part of the more than 400 visitors we had to view the operation of Radioteletype. Photo #3 is "Bud" Resch, WØFTD holding a Two Meter contact — at the Model 28 of course. Photo #4 was the "Welcome" sign in the display room. Photo #5 is KØDHT, Ellis, operating the Model 14. Photo #6 is myself — WØATM, holding a QSO with Bob Smith — WØLD.

We wish to extend our thanks to everyone who worked with us in the display room for the Convention. We are looking forward to another one and hope that we will be invited to attend. It was a lot of hard work but the fun we had and the people we met was well worth the effort. Several applications for membership has been received so we believe we have been "paid in full."

Subscription Rate $2.50 Per Year

RTTY is the Official Publication of the

RTTY Society of Southern California

and is published for the benefit of all RTTY Amateurs and Experimenters

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For "RTTY" Information:
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Midwest Amateur Radio

Fig. 1

Fig. 2

Fig. 3

Teletypers Society, Inc.

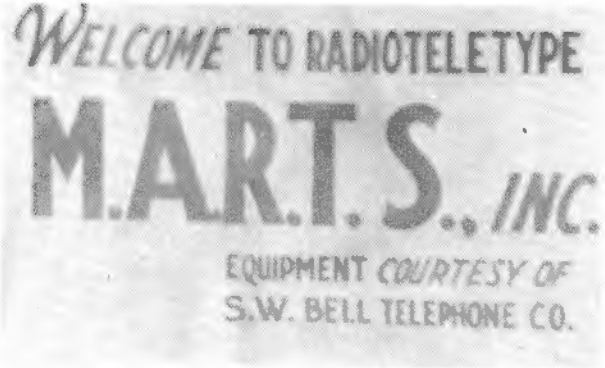

Fig. 4

Fig. 5

Fig. 6

Rare Rtty Stations

W7YZQ/7 at Idaho Convention

W7PSO at Casper Wyo.

W1PIL at Worchester, Mass.

W2VLL at Keyboard